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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/500,855	07/16/2004	Wilmert De Bosscher	016782-0308	2799

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FOLEY AND LARDNER LLP  
SUITE 500  
3000 K STREET NW  
WASHINGTON, DC 20007

EXAMINER
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RALIS, STEPHEN J

ART UNIT	PAPER NUMBER
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3742

DATE MAILED: 04/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/500,855	<b>Applicant(s)</b> DE BOSSCHER ET AL.	
	<b>Examiner</b> Stephen J. Ralis	<b>Art Unit</b> 3742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 16 July 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10, 12 and 13 is/are rejected.
- 7) ☒ Claim(s) 11 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 July 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>7/16/2004</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Drawings*

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the metal shield wrapped around the first and second conductor, as recited in claim 10, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Objections***

2. Claim 11 objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 11 is dependent on claim 1 having the step of "preventing said.....having an electrical voltage above +55 volts". Claim 11 further recites "wherein said electrical voltage is greater than 65 volts". If claim 1 cannot go beyond +55 volts, then claim 11 fails to limit claim 1 further.

3. Claims 1-11, 12 and 13 objected to because of the following informalities:

Claims 1-11, 13: item d.) "putting an electrical voltage over said infrared radiation means" should read –applying an electrical voltage across said infrared radiation means–.

Claim 10: "wrapping a metal shield said.." should read –wrapping a metal shield around said...–. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claim 12 is rejected under 35 U.S.C. 102(e) as being anticipated by Ng et al. (U.S. Patent No. 6,756,600).

Ng et al. disclose a method of avoiding arcing in a vacuum atmosphere in the presence of plasma (i.e. method of increasing the ion source lifetime by reducing residue build-up, which causes electrical short circuits to the filament or as commonly known in the art, arcing) , comprising the steps: providing a vacuum chamber (i.e. arc chamber 12 contains a vacuum; column 2, lines 55-56); providing a plasma (i.e. applying an electrical voltage across the radiation source to get an arc discharge (column 2, lines 62-67; column 3, lines 1-5, 30-36); providing a first conductor to and a second conductor from the radiation means (i.e. conductor lines from filament 18 through insulators 20 and 22; see Figure 1); and controlling a negative bias from power supply 31 that prevents an arc over the filament 18 between the first conductor and the conductor from having an electrical voltage above +55 volts (i.e. 30-50 volts; column lines 3-5). As the reference meets all material limitations of the claims at hand, the reference is anticipatory.

The Examiner notes that "preventing the electrical bias across the conductors" at filament 18 is accomplished by "controlling" the negative bias form the power supply 31. The Examiner notes that the term "control" is defined as to limit or restrict something<sup>1</sup> and if the controller is restricting or limiting the negative bias, it is in return restricting the electrical bias across the filament, therefore preventing the electrical bias to go above 30-50 volts in certain configurations.

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<sup>1</sup> Encarta® World English Dictionary (On-line), North American Edition; 14 Aug 2003.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 1, 3, 5, 6, 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ng et al. (U.S. Patent No. 6,756,600) in view of Jang (u.s.6,483,068).

Ng et al. disclose a method for heating and increasing heating power in a vacuum atmosphere in the presence of plasma (i.e. ionization of the gas and charging the ions in the gas; column 2, lines 65-67) , comprising the steps: providing a radiation means (filament 18) in a vacuum chamber (i.e. arc chamber 12 contains a vacuum; column 2, lines 55-56); providing a first conductor to and a second conductor from the radiation means (i.e. conductor lines from filament 18 through insulators 20 and 22; see

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Figure 1); applying an electrical voltage across the radiation source (column 2, lines 62-67| column 3, lines 1-5, 30-36); and controlling a negative bias from power supply 31 that produces an arc over the filament 18 between the first conductor and the conductor from having an electrical voltage above +55 volts (i.e. 30-50 volts; column lines 3-5). (See Examiner notes with respect to "prevent" in claim 12, as described in paragraph 5)

The claims differ from Ng et al. in calling for the radiation source being an infrared radiation source.

Jang teaches an apparatus for hard baking a photoresist pattern comprising an infrared radiation source (i.e. infrared lamp 210 in a vacuum chamber 200; column 3, lines 44-45; see Figure 2) to provide a radiation source wherein the temperature is easily controlled (inherent to infrared radiation sources), thereby improving the reliability of the fabricating process of a semiconductor device. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the radiation source of Ng et al. with the infrared radiation source of Jang to provide a radiation source wherein the temperature is easily controlled, thereby improving the reliability of the fabricating process of a semiconductor device.

With respect to claims 3, 5, 6 and 8, Ng et al. further disclose wherein the first conductor or the second conductor are kept electrically negative (negatively bias from arc power supply 31 to filament 18 via conductor though insulator 20; column 2, lines 62-67| column 3, lines 1-5, 30-36); wherein the method further comprises the step of providing a first and second feed-through (i.e. insulator 20, 22) through which the first

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and second conductors enter the vacuum chamber (column 2, lines 56-58); wherein the method further comprising the step of electrically isolating the first and second conductors (conductor lines from filament 18 through insulators 20 and 22 inherently electrically isolate the conductor lines; see Figure 1).

With respect to claim 9, the Ng-Jang method for heating in a vacuum atmosphere in the presence of plasma combination discloses the claimed invention except for wherein the method further comprising the step of electrically double isolating the first and second conductors. It would have been obvious to have one of ordinary skill in the art at the time the invention was made to electrically double isolate the first and second conductors, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art.

9. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ng et al. (U.S. Patent No. 6,756,600) in view of Jang (u.s.6,483,068) as applied to claim 9 above, and further in view of Golladay et al. (U.S. Patent No. 6,091,187).

The claims differ from the Ng-Jang method for heating in a vacuum atmosphere in the presence of plasma combination in calling for the method further comprising the step of wrapping a metal shield around the first conductor and second conductor and connecting the shield to earth/ground.

Golladay et al. teach a high emittance electron source comprising the step of wrapping a metal shield (i.e. refractory metal radiation shield 19) around the first conductor and second conductor (i.e. conductor feeds to filament 14 wrapped by



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refractory shield 19; column 9, lines 32-35; see Figure 3) and connecting the shield to earth (i.e. grounded via ground to shield encompassing cathode 10 in connection with the frame holding refractory metal shield 19; see Figure 3) to reduce radiative heat losses, thereby proving a more efficient radiating source. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the conductor/filament structure of the Ng-Jang method for heating in a vacuum atmosphere in the presence of plasma combination with the wrapping of refractory metal around the of Golladay et al. to reduce radiative heat losses, thereby proving a more efficient radiating source.

10. Claims 2, 4, 7 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ng et al. (U.S. Patent No. 6,756,600) in view of Jang (u.s.6,483,068) as applied to claim 1 above, and further in view of Bluck et al. (U.S. Patent No. 6,101,972).

The claims differ from the Ng-Jang method for heating in a vacuum atmosphere in the presence of plasma combination in calling for the first conductor and second conductor being prevented from having a positive electrical voltage; the first conductor and second conductor being kept electrically negative; and the vacuum chamber having walls, the method further comprising the step of electrically grounding the walls and the second conductor.

Bluck et al. teach a plasma processing system and method comprising the first conductor and second conductor being prevented from having a positive electrical voltage (i.e. voltage bias fed to the filament is between 0 volts and about -150 volts,

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preferably -120 volts; column 3, lines 52-54); the first conductor and second conductor being kept electrically negative (i.e. the bias on the filament is pulsed or biased in a negative direction (i.e. both conductors are connected to the same bias; column 7, lines 50-65); and the vacuum chamber having walls (see Figure 1), the method further comprising the step of electrically grounding the walls and the second conductor (column 3, lines 25-31; see Figure 1) to improve substrate processing systems and methods wherein ion sources may operate in a stable manner in a processing chamber and wherein the properties of the deposited layers may be improved for their intended purposes, thereby providing a more efficient method of heating in a vacuum atmosphere. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the preventing of the voltage biasing of the filament to be positive, the first conductor being kept electrically negative and the grounding of the respective elements of the Ng-Jang method for heating in a vacuum atmosphere in the presence of plasma combination with the negatively biased filament voltage; both the first conductor and second conductor being kept electrically negative; and the grounding of the chamber and conductors of Bluck et al. to improve substrate processing systems and methods wherein ion sources may operate in a stable manner in a processing chamber and wherein the properties of the deposited layers may be improved for their intended purposes, thereby providing a more efficient method of heating in a vacuum atmosphere.

***Prior Art***

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Publication No. 2002/0053880 to Miyamoto is a teaching of an ion source and operation method thereof comprising the filament/conductor and voltage biasing structure of the instant invention.

U.S. Patent No. 6,870,164 to Baldwin et al. is a teaching of an ion source and operation method thereof comprising the filament/conductor and voltage biasing structure of the instant invention.

U.S. Patent No. 6,313,428 to Chen et al. is a teaching of an ion source and operation method thereof comprising the filament/conductor and voltage biasing structure of the instant invention.

Japanese Patent No. 11036073 A to Terayama is a teaching of preventing an arc charge up (i.e. arcing) without the use of a high frequency power source.

U.S. Patent No. 6,086,679 is cumulative to or less pertinent than the references relied upon above.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen J. Ralis whose telephone number is 571-272-6227. The examiner can normally be reached on Monday - Friday, 8:00-5:00.

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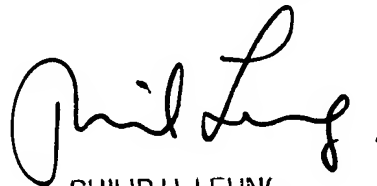
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robin Evans can be reached on 571-272-4777. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Stephen J Ralis  
Examiner  
Art Unit 3742

SJR  
April 13, 2006



PHILIP H. LEUNG  
PRIMARY EXAMINER  
ART UNIT 3742